Claims

What is claimed is:

1. A process for manufacturing a tissue implant comprising obtaining tissue to be processed; scanning said tissue to produce dimensional data of said tissue; analyzing said data by a computer system enabled with a database comprising a plurality of designs; and identifying one or more designs and quantity thereof that relate to an optimized use of said tissue, whereby one or more tissue products are produced in accord with said identified one or more designs and quantity thereof.

2. The process according to claim 1, wherein said at least one tissue sample is sterilized.

3. The process according to claim 1, wherein said at least one tissue sample is allograft, autograft, or xenograft tissue, or combinations thereof.

4. The process according to claim 3, wherein said at least one tissue sample is cortical bone, cancellous bone, fascia, dermis, whole joints, tendons, ligaments, dura, pericardia, heart valves, veins, neural tissue, or submucosal tissue, cartilage, or combinations thereof.

5. A process for manufacturing tissue implants comprising:
 a. obtaining at least one tissue sample for processing;
 b. sterilizing said at least one tissue sample;
 c. scanning said at least one tissue sample to produce dimensional data corresponding thereto;
 d. inputting said data into a computer system enabled with a database comprising a plurality of designs;
 e. identifying one or more designs and quantity thereof that correspond to an optimal use of said at least one tissue sample; and

f. machining said at least on sample of tissue to produce one or more tissue products in accord with said one or more designs and quantity thereof.

6. The process according to claim 5, wherein said at least one tissue sample is allograft, autograft, or xenograft tissue, or combinations thereof.

7. The process according to claim 6, wherein said at least one tissue sample is cortical bone, cancellous bone, fascia, whole joints, tendons, ligaments, dura, pericardia, heart valves, veins, neural tissue, submucosal tissue, dermis, or cartilage, or combinations thereof.

8. The process according to claim 5, wherein said sterilization is achieved through a process that retains the bioactive properties of said at least one tissue sample.

9. The process according to claim 8, wherein said sterilization is achieved using a process selected from the group consisting of BioCleanse, acid wash, boiling, 100% ethanol, gamma radiation, ethylene oxide, disinfectants, broad spectrum antibiotic solutions or combinations thereof.

10. The process according to claim 5, wherein said scanning comprises disposing said at least one tissue sample in a container that interfaces with at least one scanning device positioned in, on, or proximate to said container to effectuate scanning of said tissue sample.

11. The process of claim 10, wherein said scanning device is enabled to scan said at least one tissue sample in x, y, or z coordinate planes, or combinations thereof.

12. The process of claim 11, wherein said scanning device generates dimensional data corresponding to the size and shape of said scanned tissue sample.

13. The process according to claim 5, wherein said computer system is enabled with a graphical software program designed to produce images.

14. The process according to claim 13, wherein said dimensional data is converted into numerical data.

15. The process of claim 14, wherein said numerical data is converted into an image by said graphical software program.

16. The process of claim 5, wherein said identifying step utilizes an algorithm to match said data with one or more preferred designs from said database relating to an optimal use of said tissue sample.

17. The process of claim 16, wherein said data is matched with said one or more preferred designs based on similarity of dimensions.

18. The process of claim 5, wherein said database is generated from compiling dimensional data from previously manufactured tissue implants.

19. The process of claim 5, wherein upon identifying said one or more template designs and number thereof, said at least one tissue sample is directed to a specific machining device selected from a plurality of machining devices, wherein said specific machining device is configured to machine said sorted tissue in accord with said template design.

20. The process of claim 5, further comprising cutting said at least one tissue sample into a blank prior to said machining, whereby said blank is cut to have dimensions appropriate for subsequent machining into said one or more designs and quantity thereof.

21. The process of claim 20, wherein said machining is conducted by a milling device that is contained in its own environment to thereby prevent contamination from the environment external to said milling device.

22. The process of claim 5, wherein said process further comprises inspecting said one or more tissue products for quality verification.

23. The process of claim 22, wherein said inspecting is conducted by optical inspection wherein cameras are positioned for remote viewing of said one or more tissue products

24. The process of claim 23, wherein said optical inspection comprises utilizing a plurality of video cameras, mounted such that separate x, y and z coordinate planes along said product may be viewed optically to ensure complete inspection of the product quality to accept or reject said product.

25. The process of claim 5 comprising packaging said one or more tissue products.

26. The process of claim 25, further comprising sterilizing said one or more tissue products by irradiation.

27. The process of claim 5, wherein sterilizing of at least one tissue sample comprises disposing said at least one tissue sample in a chamber and sterilizing said tissue in said chamber; and scanning said at least one tissue sample comprises scanning in said chamber, such that said at least one tissue sample remains sterilized during said scanning step.

28. The process of claim 5, wherein said at least one tissue sample is transferred between steps in sterilized containers.

29. The process of claim 5, wherein subsequent to machining said at least one tissue sample, said tissue is packaged, sterilized and stored.

30. The process according to claim 29, wherein package sterilization is achieved through Sterrad sterilization procedures.

31. An automated tissue processing system comprising:
a sterilization chamber; an optimizer unit comprising at least one scanning device interfaced with at least one computer system enabled by at least one analytical software program and a database comprising a plurality of template designs; a cutting device for cutting tissue into a desired tissue blank; a routing device for routing said tissue to an appropriate milling machine for machining said blank into a desired product; an inspection station for inspecting the quality of said product; a holding chamber for holding rejected products; a packaging station for packaging and labeling accepted products; and a storage station for storing products prior to shipment.

32. An automated process for manufacturing implantable tissue products comprising:
(a) selecting a tissue sample for processing; placing said tissue sample into a sterilized chamber, wherein said tissue sample is sterilized;
(b) transferring said sterilized tissue sample into a sterilized optimizer unit, wherein said tissue sample is scanned to obtain dimensional data corresponding to said tissue sample;
(c) inputting dimensional data from said sample into a computer system enabled with an analytical software program and a database comprising a plurality of designs;
(d) analyzing said dimensional data with said analytical software program to identify a design type and quantity thereof commensurate with the dimensions of said tissue sample to maximize tissue utilization;

(f) routing said tissue sample into a sterilized cutting machine wherein said tissue sample is cut into a tissue blank of sufficient size and shape to facilitate subsequent machining of said tissue product according to said design;

(g) transporting said container to a sorter;

(h) placing said blank into said sorter, wherein said blank is routed to a milling device enabled to machine a design from the blank in accord with said identified design and quantity thereof;

(i) milling said blank to produce a finished product in accord with said identified template design and number thereof;

(j) analyzing said finished product for quality;

(k) packaging and labeling said finished product;

(l) sterilizing said packaged product prior to storage; and

(m) storing said sterilized product for at least twenty-four hours.

33. An implant produced by the process of claim 1.

34. An implant produced by the process of claim 5.

35. A process for manufacturing tissue implants comprising:

a. scanning at least one tissue sample to produce dimensional data corresponding thereto;

b. inputting said data into a computer system enabled with a database comprising a plurality of designs;

c. identifying one or more designs and quantity thereof that correspond to an optimal use of said at least one tissue sample; and

d. routing said at least one tissue sample to a machining device, wherein said machining device is programmed with the specifications of said identified design to automatically machine said at least one tissue sample to produce a tissue product in accord with said identified design.